Small Business Innovation Research/Small Business Tech Transfer

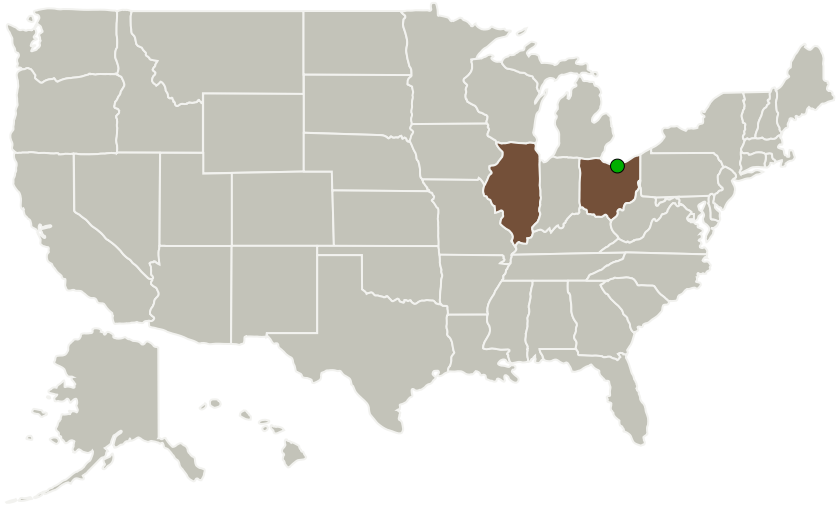
High Energy Density Lithium Battery System with an Integrated Low Cost Heater Sub-System for Missions on Titan., Phase I

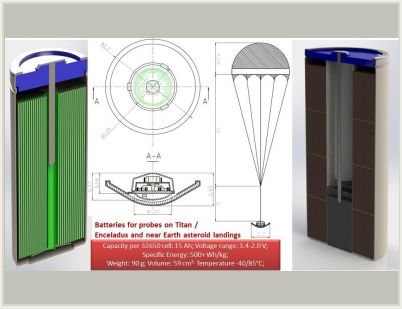
Completed Technology Project (2014 - 2014)

Project Introduction

This Phase I SBIR project seeks to develop a 500 Wh/kg Lithium primary battery for intended application as the primary power source on landers and probes for future missions to Titan/Enceladus and near Earth asteroids. The proposed battery technology aims to offer a viable alternative to Li/SO2 primary batteries which were used in the most recent mission to Titan. A thorough analysis of power requirements for the Huygens-Cassini mission (2005 landing) will be undertaken from the point of view of identifying engineering areas where the benefits of introduction of a more potent battery could be realized. Developers will focus on the engineering and performance testing of two distinctly different cell designs in a 32650 cylindrical cell housing. An integral part of the new battery will be a system of smart electrical heaters which, at a fraction of available battery power, will turn resistive heaters on and off as required to compensate for heat losses through the battery box wall (the assumption of the model being studied is that the battery should not require the use of external radioactive heating sources to maintain operation). This project will see the introduction of several new materials which will be manufactured by the contractor for purposes of boosting the energy efficiency of the proposed battery system.

Primary U.S. Work Locations and Key Partners





High Energy Density Lithium Battery System with an Integrated Low Cost Heater Sub-System for Missions on Titan. Project Image

Table of Contents

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Organizations Performing Work	Role	Type	Location
American Energy Technologies Company	Lead Organization	Industry Women-Owned Small Business (WOSB)	Arlington Heights, Illinois
Glenn Research Center(GRC)	Supporting Organization	NASA Center	Cleveland, Ohio

Primary U.S. Work Locations	
Illinois	Ohio

Project Transitions

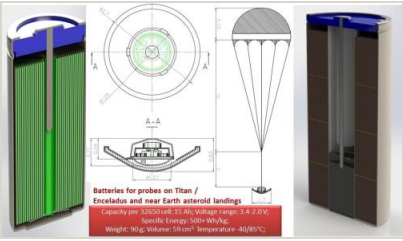
June 2014: Project Start

December 2014: Closed out

Closeout Documentation:

- Final Summary Chart*(https://techport.nasa.gov/file/137739)*

Images



Project Image
High Energy Density Lithium Battery System with an Integrated Low Cost Heater Sub-System for Missions on Titan. Project Image *(https://techport.nasa.gov/image/132287)*

Organizational Responsibility

Responsible Mission Directorate:

Space Technology Mission Directorate (STMD)

Lead Organization:

American Energy Technologies Company

Responsible Program:

Small Business Innovation Research/Small Business Tech Transfer

Project Management

Program Director:

Jason L Kessler

Program Manager:

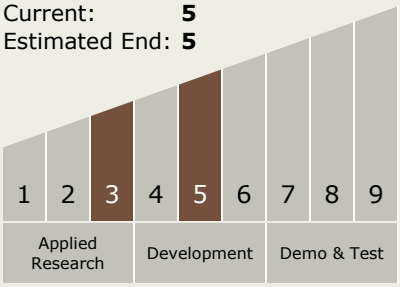
Carlos Torrez

Principal Investigator:

Igor Barsukov

Technology Maturity (TRL)

Start: **3**
Current: **5**
Estimated End: **5**



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Technology Areas

Primary:

- TX03 Aerospace Power and Energy Storage
  - TX03.2 Energy Storage
    - TX03.2.1 Electrochemical: Batteries

Target Destinations

The Sun, Earth, The Moon, Mars, Others Inside the Solar System, Outside the Solar System